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November, 1947

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SPE NEWS

Issued Monthly to all Members of the Society of Plastics Engineers

Vol. 3 No. 9 November, 1947

FIBERGLASS MATERIALS FOR PLASTIC REINFORCEMENT

By FRED T. MOORE

Cloth

Fiberglas cloth was the first product made by Owens-Corning Fiberglas Corporation to be used as a reinforcement for low pressure resins. This development occurred early in World War II years when the aircraft engineers were searching for a high strength—light weight material that would do a better functional job than any they had used. This new engineering material satisfied the aircraft engineers in other important respects, such as ease of fabrication and the fact that only inexpensive tools were required. These advantages made it possible to make quick design changes in the parts made of Fiberglas reinforced plastics. Large quantities of Fiberglas cloths were used for radomes, fuel sell liners, air ducts and many other parts.

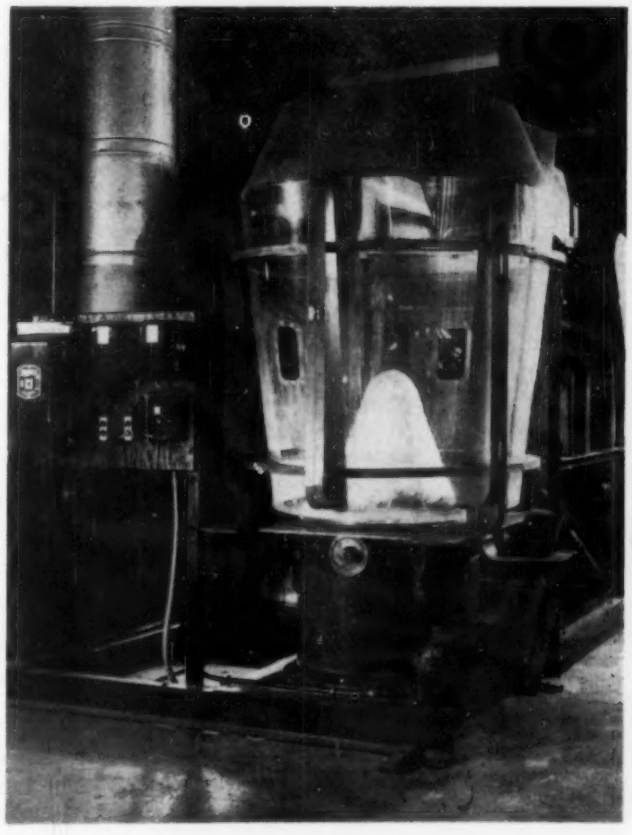
Since the war, O-C-F has developed a new series of high strength eight harness satin weave cloths for plastics reinforcement, Nos. 181, 182, 183 and 184 with thicknesses of 8, 13, 18 and 27 mils respectively. These new fabrics are now widely used and supplement the standard line of plain weave cloths.

Mat

The successful war-time applications of cloth indicated the vast possibilities for Fiberglas materials in the plastics reinforcement field. Mats were needed for many applications where the cloths were not economically feasible because of their higher cost due to the necessary twisting, plying and weaving operations required to make them. Also the mat fibers would be free to move and parts with deeper draws could be molded. Mats also would provide a product having equal strengths in all directions. The O-C-F Laboratory is engaged in the development of mat products of low cost and wide utility.

Type 504 mat (formerly T-35) is composed of continuous strands of 150-1/0 yarn laid down in a circular pattern and bonded together with a thermoplastic binder to form mat with very high impact strength. Laminates made of this mat have edge impact strength of over 40 foot pounds per inch of width.

Type 503 mat (formerly T-36) is the newest mat product and is lowest in cost per pound. It is composed of 150's continuous strand taken directly from the forming tube and cut in 2 inch lengths. Each strand contains over 200 individual filaments or fibers of glass. Style 1 of Type 503



mat is bonded with a thermosetting resin which is fully cured by passing through an oven. The resin binder provides high tensile strength in the mat of at least 15 pounds per inch of width so that it may be successfully drawn through dip tanks in order to apply the laminating resin which

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SPI VS. SPE – THE CASE FOR SPE

By THOMAS E. ORR, SPI and SPE

This article reviews for our Members, the meetings and negotiations with The Society of the Plastics Industry (SPI) during the past year. In this period the writer has been in contact with engineers and industry on a country-wide basis, and has been officially active in The Society of Plastics Engineers (SPE), and a voting member of SPI.

In order to understand the problems encountered, let us review the types of organizations of SPE and SPI.

SPE is an association of individual engineers incorporated as a non-profit organization in Michigan. Its objects are to promote in all lawful ways the Arts, Sciences, Standards and Engineering Practices connected with the use of Plastics. Each member votes. The Society is made up of 24 Geographical Sections extending from Coast to Coast. These Sections meet monthly in their areas and are governed locally. Nationally SPE is controlled by a National Council composed of a National Director elected by each Section. National Headquarters has no paid officials. With approval of the Council the President appoints the National Committees. Nationally SPE conducts Professional Activities, National Annual Technical Sessions and Conferences; publishes monthly the SPE News and Technical Proceedings and cooperates with all other National Societies for the advancement of Plastics.

Financially SPE depends on an individual Initiation Fee and Annual Dues of Ten Dollars. This amount is divided equally with the Local Sections and in case of New Sections the entire Initiation Fee goes to the Local Section. Such policy creates strong Local Sections. The combined financial strength of the Local Sections is far in excess of the National Treasury. SPE belongs to the individual member and the local sections.

The Local Sections are governed by an elected Board of Directors who elect officers on a non-succession basis. Local committees correspond to the National Committees. These Sections conduct periodic meetings and render services to the individual through these meetings as follows:

1. Values gained from just getting together and association with other engineers.
2. Self-Education and Group-Education.
3. Educational Values for young engineers and other personnel.
4. Forums for the discussion of mutual problems.
5. Promotion of better uses of plastics through improved understanding.
6. Improved community public relations for plastics.
7. Cooperation in community objectives.
8. Cooperation in Educational Programs.

Nationally SPE assists Local Sections in attaining their objectives in many ways — some of these we list:

1. The National Committees make periodic reports of great value such as for example the report of our National Speakers Committee. This report lists all Speakers available, their subject, length of films, rating and color, length, subject. The report lists meeting places for all sections, dates of future meetings, hour of meeting and gives many suggestions on the conduct of interesting meetings.
2. Through Professional Activities and subordinate committees the Section has the benefit of Tests and Data accumulated by other Sections such as the Tests and Standards set up by the Detroit Section on Laminates, and the End Use Specifications on Business Machines set up by the Miami Valley Section. Through the

(Continued on Page 10)

SECTION PROGRAMS

SECTION	DATES Nov.	Dec.	Jan.	LOCATION
Buffalo	28	26	30	Westbrook Hotel, Buffalo
Central Ohio	14	19	16	Throughout section
Chicago	4	2	6	Merchants & Mfrs. Club
Cleveland	28	26	30	Brown's Cottage, 17 & Euclid
Detroit	28	29	30	Rackman Memorial
Indianapolis	21	19	16	Athenaeum-Turners
Miami Valley	6	4	8	Engineers' Club of Dayton
Newark	12	10	14	Newark Athletic Club
Northwestern Pa.	13	10	8	Hotel Kenyon, Erie, Pa.
Philadelphia	18	16	20	Franklin Inst., Philadelphia
St. Louis	26	24	28	DeSoto Hotel
Rhode Island and S. S. Mass.	12	10	14	Providence Eng. Socy. Bldg.
Western New England	5	3	8	Hotel Sheraton, Springfield Mass.

1948 DUES

Invoices Enclosed with this Issue

Please Pay Promptly

TOLEDO SPONSORS THE NEWS

Toledo Section Officers: Earl Fisher, Sec'y; Edward Johnson, President; Emmett Sullivan, Vice-Pres.

Greatly to be commended are the officers and members of the Toledo Section for their excellent work in the sponsorship of this issue of the News. Not only are the technical articles "Fiberglas" and "Water" by Toledo members, but also the major portion of this month's advertising was solicited by Toledo members. Our thanks to the Toledo Section. and to Toledo industry for their support and cooperation.

In the Section sponsorship of the News, we display not merely the routine activity of the different Sections, but show the very considerable talent and technical skills of the individual members. As the National SPE grows, the News will grow, and the services rendered to the industry by each Section will be made available to the whole industry through the National SPE, and the News.

Watch for the Newark sponsored issue in December.

TOLEDO PLASTICS EXHIBIT

By PAUL MATTIMOE
Libby-Owens Ford Co.

The plastics exhibit sponsored by the Toledo Section of SPE is one of the important achievements of the section. Originally housed in the foyer of the Toledo Public Library the exhibit remained there for six months in 1945 after which it was set up in a permanent home in the Toledo Museum of Science.

This colorful and educational display of molded and laminated parts and articles fabricated from plastic film is representative of the products of the plastics industry in Toledo. Approximately

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WATER

By E. H. BALZ, Ph.D. Ch.E.

Process Development—Industrial Research

The part that water plays in our life is both varied and vital. It is a necessity in maintaining life and thereafter through the same cycles helps to regenerate life from the inanimate. This may be through a biological, physical or chemical reaction. Our present interest is directed chiefly to its physical and secondarily to its chemical action. Water is ever present in our atmosphere, its presence as liquid is frequent and as solid occasional. The choosing of material for fulfilling a specific role necessitates the study from many angles. The material presented here deals with some of the factors involved in the behavior of material with water.

It is important to keep in mind that moisturs in our atmosphere is ever present. We read about water absorption in so many places that we unconsciously drop into a groove and accept an arbitrary figure as a measure of the effect of water. When we consider a material for some specific application, we usually do so primarily because the material possesses one or more advantageous properties such as color, transparency, dielectric strength, gravity, mechanical strength, elasticity, etc., not mentioning cost and availability. It would be well to examine the effect of moisture content on the specific property desired as well as to assure ourselves of the stability of the product to both moisture in the atmosphere and when immersed. The well worn statement that hindsight is easy and foresight difficult always has been true and there is no indication that it will not continue to be so. Fortunately we learn by our own mistakes and those of others.

When colloidal substances are exposed to air (which always contains moisture) they take up some of the moisture and in time come to an equilibrium. The quantity absorbed and the time required depends upon the nature of the material and the moisture content of the air (humidity). Since the latter varies with the weather and geography, it follows that such materials are continually undergoing change in moisture content. The fact that such changes take place is no indication that the material is objectionable. The mummies of Egypt (wrapped in cellulosic fiber) and wooden objects found in their tombs prove the ability of material, having a wide range

(Continued on Page 19)

MOLDER desires Sales Engineer in the Illinois and Wisconsin Territory who is in a position to take on another line with his established business and to operate on a commission basis. Write BoxB-120, SPE News, c/o J. H. Day, Case Institute of Technology, 10900 Euclid Ave., Cleveland 6, Ohio.

EXTRUSION IS TOPIC AT DETROIT FORUM

Mickey Reports on Technical Activities Program

By WALTER KOSY

The October meeting of the Detroit chapter of SPE was presided over by Carl Holmes of American Plastics and was held in the Rackham Memorial Building on Oct. 24th. Following dinner and some preliminary announcements by Detroit Chapter President, Walter Noble and Doc Storfer, the speaker of the evening, Mr. Paul Fortner of the duPont Corporation was presented.

Mr. Fortner's subject was extrusion and he began his talk with a brief outline of the history of the art. He described early problems in the industry with respect to materials, methods, and machinery.

On modern extrusion methods, Mr. Fortner described the techniques and problems involved with three specific plastic materials, the acrylics, Nylon, and Polythene.

Factors such as barrel design, screw design, die design, pre-treatment of material, temperature control, etc., were discussed in detail. The interest created was evidenced by the group discussion and questions at the conclusion of his talk.

Following a report by Mr. John Mickey of the Ford Motor Co. on the progress of the technical committee, Mr. Phil Robb of Hercules Powder introduced Mr. Bill Bracken of the same company, who gave a brief history of the use of cellulose acetate and reviewed the properties and merits of this material, illustrating his talk with various test samples, which by coincidence, he had brought with him.

Mr. Mickey's board of technical "experts" with two new members, Mr. Harry Haaxma of Standard Products, and Mr. Walter Kosy of Lyon, Incorporated, was then called into session and the questions and discussion stirred-up by this technical forum carried the meeting into over time again.

Meeting was adjourned after a few cross-eyed looks from the janitor.

The November meeting, on the 28th, will be devoted to committee reports concerning the National SPE Show to be held in January in Detroit. This is to be really the all-out effort to make the National Show a huge success.

Technical Committee Report

A meeting of the Technical Activities Committee was called in the Rackham Building on October 16, 1947, with Mr. J. Mickey, PAC Chairman, presiding, and H. Klein, R. Dailey, A. D'Agastino, C. Holmes, C. Whitlock, A. Hendershot, J. Totten, W. Noble, J. Southwell, present.

The following topics of discussion were taken up:

I. Regarding the Forums at the regular monthly meetings:

After a general discussion it was unanimously decided that the forums should be continued similar to those initiated at the spring meetings. At these forums, subjects for discussion will be taken up with a topic chairman for the evening to introduce the discussion and a panel also appointed on a month-to-month basis to act as a round-table discussion group.

The Forum discussions will be conducted under the direction of a permanent chairman, vice-chairman, and secretary: Mr. Storfer, Chairman; Mr. R. Metzler, Vice-Chairman, and Mr. J. Southwell, Secretary.

At the first regular meeting held October 24, 1947, the topic for the evening was "Cellulose Acetate," with Mr. Phillip Robb acting as the topic chairman. The discussion panel consisted of Messrs. Bradley, Dailey, McDonald, Kithill, Southwell, Anderson, and Holmes.

It was further decided that the topics from month to month should alternate between materials and molding techniques.

II. National Activities:

Pertaining to national activities of the Professional Activities Committee, in accordance with the request by the National Chairman, Mr. H. Kline, has written a comprehensive list of topics to be considered by each local group. Regarding this work, it was decided that the Detroit Section would, for the time being, line itself up with the local laminating group, and work on the following subjects:

a. Tests on odorless properties of laminates.
b. Bibliography on the uses of laminates in the automotive industries.

General discussion of molding technique division brought out the necessity of organizing practical pressure formulas of value to molders and materials men. Messrs. Whitlock, and Totten have agree to work on this subject and report on the possibility of including this in our January SPE News.

Discussion pertaining to Educational Package for SPE Sections and Colleges was postponed until the next meeting.

SHAW INSULATOR APPOINTS

Frank H. Shaw, President of the Shaw Insulator Company, Irvington, New Jersey, has announced the following sales appointments: Mr. James W. Whitfield, 6321 32nd Street, N. W., Washington 15, D. C. Territory: District of Columbia, Maryland, Delaware, Arlington and Fairfax Counties in the state of Virginia. Mr. R. L. Foote, Engineered Plastics, Inc., Gibsonville, North Carolina. Territory: Tennessee, North Carolina, outh Carolina, Georgia, Alabama, Mississippi and Florida. Also the state of iVrginia with the exception of Arlington and Fairfax Counties. Mr. Lawrence H. Burns, Jr., L. H. Burns Company, 837 Potomac Avenue, Buffalo, New York. Territory: State of New York and Northwestern Pennsylvania. Pittsburgh is included in this territory. The area South of Kingston, New York is excluded. American Plastics Engineering Corporation, 3020 East Grand Boulevard, Detroit 2, Michigan.

CENTRAL OHIO SECTION WINS SPRING MEMBERSHIP CAMPAIGN

The Central Ohio Section made the best showing in the Spring Membership Drive exceeding its Quota by 350%.

Other Sections exceeding their quotas in the order of performance were Buffalo, Philadelphia and Newark.

The Membership committee also compliments the New York Section on its fine showing.

During this Campaign the Buffalo Section assumed the sponsorship for the new Section at Rochester, New York. This new Section has had an excellent record and the Buffalo Section did a grand job.

ISLYN THOMAS SPEAKS ON HOBBING AT NEW YORK

By WILLIAM SCHACK

An instructive talk on "Hobbing, Its Possibilities and Limitations" was given by Islyn Thomas, Thomas Engineering Co., at the October 14 meeting of the New York Section held at the Hotel Sheraton. After a historical survey of the development of the hobbing process, Mr. Thomas pointed out that the average small-scale moldmaker would be better off to avail himself of the service of specialists for such processes as hobbing and engraving rather than attempt to install all the necessary equipment in his own shop.

Aside from the high cost of hobbing equipment, the process is expensive because it requires a good deal of time and highly skilled workmen. Hobbing in depth, Mr. Thomas explained, may require as many as four separate thrusts, with a period for annealing between each one.

Valuable as hobbing is, it is not to be used in the making of every mold, and Mr. Thomas gave instances where it should definitely be avoided. In what may be called compromise molds, so far as the method of construction is concerned, it is economical to hob some portions and machine others.

Mr. Thomas was assisted in his presentation by Edward Spitzig, Newark Die Company, who answered questions relating to such details as the choice of steels for specific types of molds.

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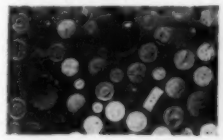

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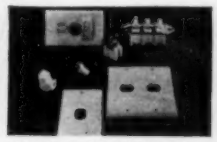

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CHICAGO HEARS TALKS ON INJECTION MACHINE DESIGN

By VAL WRIGHT

A double feature program highlighted the November meeting of the Chicago Section of SPE, held at the Merchandise Mart on November 4. Speakers included David Sloan, Lester Engineering Co., who spoke on "Injection Cylinder Design" and Lynn F. Bittler, Bittler Engineering Co., Chicago, who described and demonstrated the Robotron automatic cycle controller.

Mr. Sloan discussed the requirements of an efficient injection cylinder, including adequate plasticizing capacity, pressure, accurate temperature control, etc., and explained that the final design must always be a compromise between a restricted condition and an open condition, to insure full plasticization of the material without impeding its passage any more than is necessary. He showed the importance of proper joint location, selection of metals and other factors in efficient operation of the cylinder.

The latter part of his talk was devoted to a discussion of design evolution with special relation to the spreader section of the cylinder. He illustrated and explained some of the recent work done by his company on independent spreader sections which afford individual temperature control at this point and insure an adequate degree of heat in this section of the cylinder. He exhibited an 11½ oz. comb sprue and a 15 oz. disc of ethyl cellulose molded on a 12 oz. injection press incorporating this new cylinder design.

Supplementing his talk with an actual demonstration of the instrument, Mr. Bittler explained that the Robotron is an electrical time cycle controller which, when properly hooked up with a molding press, makes the mold cycle an automatic operation. The unit, which is powered by a synchronous motor actuating locking and unlocking relays and rotary switches, may be mounted directly at the press or, if desired, in a supervisor's office or other remote location.

The Robotron can be set to handle as many as six different press operations, such as low pressure to the ram, introduction of high pressure, breathing of the mold, etc., and offers great flexibility as far as the time cycle is concerned. Provision may be made for safety controls which would permit the press operator to stop the press in an emergency, independent of the automatic cycle.

William L. Hess, Anesite Co., urged SPE members to lend their support to the forthcoming Chicago Production Show, which will be held March 21-23, 1948, at the Hotel Stevens. He explained that SPE is to sponsor a technical panel during the show and that an attempt would be made, in selecting papers for this panel, to dwell less upon highly technical aspects of the plastics industry and to emphasize just what the industry has to offer the production man. Al Voss, Western Electric Co., is chairman of the committee arranging this panel.

Mr. Hess also reported that the Chicago Technical Societies Council, which sponsors the annual Production Show, is planning the eventual construction of a building in Chicago similar to the Horace H. Rackham Educational Foundation in Detroit, which will serve as a permanent home for its more than 50 sections. Preliminary plans for the structure are now in preparation.

Elmer C. Maywald, program director, announced that the annual Christmas party of the Chicago Section of SPE will be held on January 9 at the Edgewater Beach Hotel. Tickets for the affair will be $7.50 each and attendance will be limited to 300.

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AND

COMPRESSION

ST. LOUIS NEWS

By J. MAVER FEEHAN

The St. Louis Section held a meeting at the Melbourne Hotel at 8 p. m. on the evening of Nov. 19th.

The St. Louis Section is pleased to announce that the Plastics Course, sponsored jointly by the Section, The Associated Retailers of St. Louis and The Board of Education has met with considerable success. Planned as a course for retail sales people and buyers, it has been just that, with the information given in a "down to earth" way that has gone over quite well with the persons enrolled. The course began on Oct. 8th and will run for 8 consecutive Wednesday nights. There are about 75 enrolled and from the comments, they are not only learning, but are having a good time doing it.

ELECTION OF NATIONAL DIRECTORS IS CHANGED; OTHER BY-LAWS AMENDED

Fourteen of the sixteen National Directors were present, which indicates the great interest of all in SPE and its great work.

We want to bring to your attention certain items in the minutes for the necessary action:

1. **ELECTION OF NATIONAL DIRECTORS:** The By-Laws have been amended so that each Local Section will have a National Director which the **Local Section Elects** for a three year term.

   Sections having Directors on the existing National Council will not vote for a Director this year since in order to maintain continuity the present National Directors will serve out their term of office.

   Accordingly, the following Sections will elect a National Director in accordance with the amended By-Laws: Central Ohio, Chicago, Cleveland, Eastern New England, Indianapolis, Mid-Continent, New York, Northwestern Pennsylvania, Rhode Island and S. E. Massachusetts, Rocky Mountain, Rochester, St. Louis, Southern California, Western New England, Golden Gate, and Upper Midwest Sections.

   The next regular meeting of the National Council is called for 4 p. m. Wednesday, Jan. 21st, 1948 at the Rackham Building, Detroit, Michigan. Please have your new Directors present at this meeting.

2. **MEMBERSHIP CAMPAIGN.** The National Council and Membership Committee is desirous of having all Local Sections start new membership drives which will give SPE a membership of over 2500 by the time of the National Annual Meeting. Section Officers and Section Membership Committees should take steps to add Members as follows:

Buffalo	15
Central Ohio	20
Chicago	40
Cleveland	30
Detroit	40
E. New England	20
Indianapolis	10
Miami Valley	20
Mid-Continent	25
Milwaukee	10
Newark	30
New York	35
N. W. Pa.	15
Philadelphia	25
R. I. & S. E. Mass.	25
Rocky Mountain	20
Rochester	20
St. Louis	20
S. Calif.	25
Toledo	15
W. New England	20
San Francisco	20
U. Midwest	25

3. **SPI.** You have read the Advisory Board report on this subject. The National Council agrees with the Advisory Board and believes the independent integrity of SPE should be maintained in cooperation with other groups for the best interests of the Plastics Industry.
4. **LAPEL PINS — MEETING IDENTIFICATION BADGES — BINDERS.** Lapel Pins will be ready soon and we need your orders from the Sections. Identification Badges have been requested by certain sections for permanent use at their meetings. These badges are 2¾" in diameter in red urea with pin with an insert for names — the insert can be varied in color to identify guests. Same badge as used in Chicago in January. Approximate cost is 25 cents each. Binders $1.00 each. (Order for your Section Officers and Committeemen) Lapel Pins at cost (Not over 25 cents each).

Mr. Orr presided. All National Directors present with exception of George Bohrer of the New York Section and R. B. Bower of the Indianapolis Section.

Upon motion duly made, seconded and passed, the minutes of the Council meeting of May 7, 1947 were accepted as submitted in writing to the Members of the Council.

Upon motion duly made, seconded and passed, the minutes of the Executive Committee of July 30, 1947 were accepted as submitted in writing to the Members of the Council and the actions of the Executive Committee were approved.

The Report of the Advisory Board of July 30th, 1947 was read and considered. Upon motion made, seconded and passed, this report was filed and the Advisory Board was thanked for their excellent report.

Reports of the Officers followed, with discussions.

Director P. R. Marvin, Chairman of the Finance Committee and Treasurer of the Society presented

(Continued on Page 8)

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By-Laws Amended

(Continued from Page 7)

financial report as of September 30th, 1947.

Upon motion duly made, seconded and passed, the dues for 1948 are to be billed approximately December 1st, 1947 together with any dues that are in arrears, and the Membership is urged to pay 1948 dues promptly.

Mr. Orr reported that 11 Sections had been paid on October 1st covering the National Report for the period from July 1st to September 15th, 1947. This National Report is made quarterly. This report indicates the payments due the Sections on account of Fee and Dues collections.

Professor Louis Rahm of Princeton University, Member of the Newark Section, presented an excellent report for the National Education Committe of which he is Chairman. Upon motion duly made, seconded and passed, the Council endorsed this Educational Program and requested that full publicity be given the Program as directed by Professor Rahm.

Director P. R. Marvin reported as Chairman of the By-Laws Committee. After full discussion of the National Council and Advisory Board, Mr. Marvin presented By-Laws as follows in accordance with the call for this meeting.

PROPOSED BY-LAW NO. 1.
MANAGEMENT OF THE SOCIETY

B-24 The Council shall consist of one Director from each section of the Society.

B-26 A quorum for the transaction of business at meetings of the Council shall consist of a majority of the Directors comprising the Council.

B-30 The annual election of Directors shall be held coincidentally with the election of section Directors.

B-31 Directors shall be elected to serve for a period of three years beginning at noon on the Wednesday following the second Tuesday of January, immediately following election.

B-32 (To be deleted)

B-33 Each Section nominating committee shall, on or before October first of the year preceeding the expiration of term of office of the Section's National Director, nominate two affiliate Members in good standing as candidates for election as National Director.

B-34 The Section Secretary shall send ballots by first class mail to all Members in good standing, who are affiliated with the Section, after December tenth but prior to December twentieth.

B-35 The ballots for Section elections shall contain the names of the two candidates and one blank space below the list of candidates, together with squares opposite each of the names and the blank space; and shall also contain the title "Ballot for ——— Section Election," and the instructions "Vote for one Only."

B-36 Each Member voting shall place a cross (X) opposite the name of the candidate for whom he desires to vote, in the square provided for that purpose, or he may write into the blank space the name of the Member in good standing and affiliated with the Section and vote for him in lieu of the candidates already listed.

B-37 The ballot shall be sealed in an envelope which shall bear no other marking except "Ballot for ——————— Section Election," and this envelope and contents shall then be sealed in another mailing envelope on which the Member shall, for identification, write his signature in ink in the upper left corner.

B-38 The ballot thus enclosed shall be mailed or delivered to the Section Secretary who shall certify to the signature and eligibility of each Member voting, but the Section Secretary shall hold the ballots unopened for the Section Election Inspectors Committee.

B-39 Polls for the casting of ballots for Section elections shall close at twelve o'clock noon on the day of the annual meeting of the Section, and any ballots received after that time shall not be counted.

B-40 The Section Election Inspectors Committee shall remove and destroy the outer mailing envelopes, and then open and count the ballots; the candidate receiving the highest number of votes shall be declared elected. The results of the election shall be reported to the Section Secretary, who shall advise

(Continued on Page 18)

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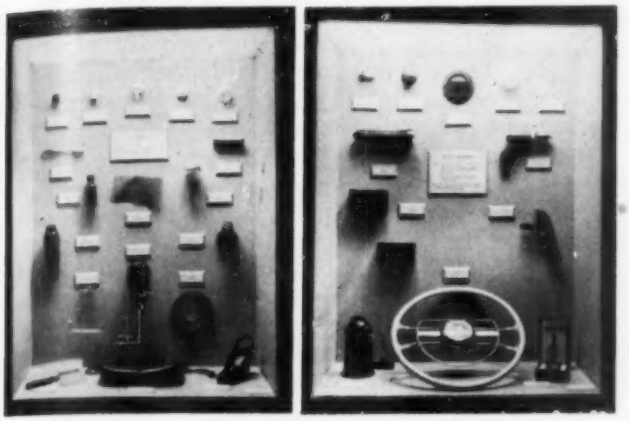
TOLEDO EXHIBIT

(Continued from Page 3)

fifty compression and injection molded items ranging in size from small bottle closures to a large vacuum cleaner housing are included in the exhibit which is arranged in a series of sealed display cases with built-in lighting fixtures.



In setting up the exhibit emphasis was placed not only on the wide range of applications of plastics but also on the variety of materials available to the plastic molder or fabricator. One of the display cases contains samples of twelve different resins and molding powders in various colors and each item in the display is accompanied by a printed placard identifying the article and the basic resin from which it was manufactured. All of the resin plastics in common use are represented including phenolics, ureas, melamines, cellulose esters, acrylics, styrene and vinylidene plastics, and vinyl elastomers. Every article in the display was chosen to exemplify good functional design and proper choice of material. As a result many of the molded parts are so called "bread and butter" applications of plastics such as automotive distributor caps, camera cases, cosmetic containers, etc. Somewhat more novel applications are represented in the exhibit by the all plastics harmonica and by a group of fishing lures molded in striking colors. A group of products manufactured from vinyl resin supported film which features a ladies black patent purse and a pair of formal slippers is also included in the display.

Arrangements have been made by the Toledo Section to keep this exhibit of plastic products abreast of new developments in the industry, and to expand its educational features.

Public reaction to this effort to broaden common understanding of plastic products has been enthusiastic. Thousands of Toledoans have seen this exhibit since it was first set up and messages of congratulation have been received by the Toledo Section of SPE from local educators, businessmen and others for a job well done.

TENITE HAS EXHIBIT

Such diverse products as duck decoys, piano actions, shotgun stocks, football helmets, and taxidermy teeth — all made from Tenite plastic — make up the Tennessee Eastman Corporation exhibit at the New Products and Television Show which opened Oct. 25th at Convention Hall in Detroit, Mich.

Sports enthusiasts will have an opportunity to see first hand the new water-resistant, non-splintering duck decoys. These decoys are molded in permanent, realistic colors which eliminate seasonal painting. Popularly priced shotguns, with beautifully molded high-impact Tenite stocks and fore-ends, as well as a wide range of fish lures and fishing equipment, will also be displayed.

Scores of other Tenite products including flourescent light diffusers, dolls, steering wheels, colorful tool handles, bus stanchions, sliding doors for kitchen cabinets.

FALL MEMBERSHIP CAMPAIGN

The National Council and The Membership Committee is desirous of having all Geographical Sections conduct fall Membership campaigns which will give SPE a National Membership of 2500 by the time of the January 22, 1948 Annual Meeting.

Quotas assigned the Sections for this drive are as follows:

Buffalo — 15
Central Ohio — 15
Chicago — 35
Cleveland — 30
Detroit — 40
Eastern New England — 20
Indianapolis — 10
Miami Valley — 20
Mid-Continent — 25
Milwaukee — 10
Newark — 30
New York — 30
Northwestern Pennsylvania — 15
Philadelphia — 25
Rhode Island and S. W. Mass. — 20
Rocky Moutain — 20
Rochester — 20
St. Louis — 20
Southern California — 25
Toledo — 15
Western New England — 20
San Francisco — 20

Section Officers and Section Membership Committees and all members are requested to take the necessary steps to make the above quotas.

The National Membership Committee is

Thos. E. Orr, Chairman
Eastern Chairman — W. J. Dunnican
J. H. Dubois
C. C. Pickering, Jr.
Mid-west Chairman — T. E. Richards
A. J. Werner
R. G. Dailey
Chas. Dassing
Western Chairman — Lee T. Bordner

S.P.I. vs. S.P.E.

(Continued from Page 2)

same leadership Sections are assigned Tests and Specifications for completion.

3. Annually a National Technical Conference is held where leading engineers present the newest engineering developments in Plastics. Forums for National Discussions are held. The problems of the End User of Plastics are discussed and developed into specifications.
4. Our National Educational Committee formulates programs for instructions of learning. This Committee advises Local Sections and learns from Local Sections the programs and courses in effect at institutions.
5. SPE is being called upon to assist our nation in defense. Nationally SPE gives direction to this program and all Sections are in a position to render great assistance. For example, the Newark Section is being retained to write a Plastics Handbook by the Bureau of Ordnance through Pickatiny (N. J.) Arsenal.

SPI is a corporation. The control is not vested in the individual but is retained by approximately 600 company memberships. Each company member designates an individual voting member to handle its interests. Professional Members and Associate Members do not have a vote in the control of the Corporation. The corporation is controlled by a Board of Directors. The candidates for office are selected as a slate by a Nominating Committee and voted on by the voting members. Financially the member companies contribute in proportion to their plastics output. SPI maintains an extensive National Headquarters with a paid staff. Geographically SPI maintains Sections in New England, Midwest, Philadelphia, Pacific Coast and Canada with branch offices on the Pacific Coast and Canada. Members of these Sections meet twice annually at resort hotels for discussion and golf. The Philadelphia Section meets with SPE. Financially each Section presents a budget of requirements to the National Directors for approval. Sections select a Chairman and other officers.

SPI concerns itself mainly with the following departmental activities: Accounting, Frequency Allocation, Plastics Expositions, Engineering, Plastics Pioneers, Public Relations, Traffic, Industrial Divisions, Informative Labeling.

With the above Sketches of the organizations in mind, let us detail the progress of the negotiations. Beginning in April of 1946 the first meeting was held in New York City, followed by a meeting in Chicago in October. Late in 1946, the Plastic Materials Manufacturers Association (PMMA) entered the picture as a go-between in the negotiations offering their services for the good of plastics, with the object of developing a coordinated and unified engineering program between SPE and SPI, and of joining the two organizations into one. The advantages of this unified program were stated to be (1) Financial Support; (2) Saving of time and effort.

SPE met with the PMMA Committee in Chicago in January, 1947, and again at Niagara Falls, Ontario in February, 1947, and proposals were exchanged. In Chicago, in May, 1947, the National Council of SPE and the Board of Directors of SPI were in session at the same time. The formation of a Joint Committee was agreed upon to formulate the desired program. This Joint Committee consisted of four members of SPI and four members of SPE. This Joint Committee met in New York City in June, 1947, developed the basis of a suitable program which was unanimously adopted by the committee members for presentation to SPI and SPE. The program was accepted by SPE. However, the Board of Directors of SPI meeting at the Nippersink Country Club at Genoa City, Wisconsin, on June 27, 1947, rejected the findings of the Joint Committee. While no grounds were immediately stated, it was later given out that rejection was based on financial grounds. The function of the Joint Committee was not a financial function. Since this time, no progress has been made toward the development of such a program.

Through the PMMA Committee, SPI has offered a plan whereby SPE would become a department of SPI under the control of the SPI Board of Directors. This plan merits careful consideration.

This Engineering Department of SPI would take the same organizational level with other departmental activities of SPI. Under SPE, engineering activities have the full and only consideration of the entire organization. Under SPE engineering is given 100% attention.

Under the SPI proposal the individual engineer

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would have no real voting rights. SPE feels that the rights, dignity and contribution of the individual engineer are in line with the American concept of individual enterprise and the many benefits that this gives to the American system.

The strong independent local Sections of SPE would vanish with the SPI proposal. SPE at present holds over 200 meetings per year for the good of plastics, about twenty times more than SPI.

Financially, the support of SPI would be valuable, but it is not essential. A strong cooperative unified engineering program depends on the efforts of many individuals — the enthusiastic support of these individuals can not be purchased. SPE has the loyal support of the individual.

SPI says that their company members have the necessary laboratory facilities necessary to work out tests and engineering data required. That is certainly true. However, it takes individuals to operate those facilities. No forward looking company would deny the use of such facilities to a group of individuals working for the good of plastics.

If SPE and PMMA became departmental functions of SPI, then SPI would dominate the entire plastic field. Is this desirable? There is a friendly competition between SPE and SPI in programs. This competition is of great value. Competition is the mainspring of business life.

SPI's new promotional piece "SPI in Action" states that the Enginering and Technical Committee is composed of more than 200 Members — a colony in itself. The word "colony" seems well chosen — the status of full independent statehood or dominion status not yet having been reached. Many of these engineering members have no vote in the conduct of SPI. On the other hand for comparison SPE is made up of over 2000 Members each with a full vote in the conduct of all affairs.

SPE makes many contributions leading to increased use of plastics. Many end users of Plastics do not belong to SPI. A list of those companies would make-up a book in itself — but just a few companies whose men are SPE's National Directors are The Bell Telephone Company, The National Cash Register Company, The Spaulding Fiber Company, The RCA Victor Company, The Socony-Vacuum Oil Company, The Philco Corporation, and many others. These organizations want their individual engineers to belong to SPE. They desire engineering information on Plastics. SPE is approaching the field of end use specifications so that plastics will be engineered into the new products of American Industry.

There is still plenty of work to be done for Plastics by all organizations. There is so much work to be done in fact that one hardly knows where to start. Bibliographies, specifications, tests, research, publications of data presented properly and engineered properly, etc., are just some of the great tasks ahead. It is fallacy to think there is room for only one organization is a growing field as large as plastics. Concerning the saving of time and effort, there is so much work to be done in Plastics as we have outlined that there is no need for duplication of any nature.

There is another important consideration which has been granted by all SPI conferees. If SPI should take over SPE, another organization similar to SPE would be started very soon as a result of the spirit of independence and individual initiative which SPE fosters in its members.

Industrially Plastics has grown by leaps and bounds. It may have grown too fast. It may lack perspective because the industry is young. Growing pains have been encountered. In no other industry does the Trade Association attempt to dominate the Engineering Society. Experience has determined that this is unwise. Engineering should not be essentially altered by industrial experience. The Government of the United States often insists on pure engineering, and not on a brand of engineering diluted with industrial practice.

Engineering has contributed greatly to the advancement of Plastics through science and research. Engineering will contribute even more to future development. The Society of Plastics Engineers feels that its organization is fundamentally on sound ground and that its contribution to the future good of Plastics will be greater in the future than in the past. The National Council and Advisory Board of SPE have the deep feeling that the independence and integrity of the engineer and of SPE should be maintained for the future development and good of Plastics.

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PLASTICS-CHEMISTRY AND PHYSICAL PROPERTIES

By C. W. GAYLOR

Continued from the October Issue of the SPE News

The softness and rubberiness of polyisobutylene and the hardness of polyvinylidene chloride is not due to the difference in chain size or shape physically but to the greater force between the chlorine atoms which exceeds the force between the methyl groups.

Other examples of the effect of side groups will be observed in a comparison of polyethylene and polystyrene. Polyethylene is tough and flexible while polystyrene is brittle. They are both hydrocarbons (contain only the chemical elements carbon and hydrogen). The phenyl group in the styrene does not permit good chain packing and orientation. It should be mentioned here that both polystyrene and polyethylene are exceptionally good electrical insulators because they have no polar groups. The other vinyls, such as polyvinyl chloride, are not as good insulators since the substituents are polar.

The effect of size of side group on softening point is illustrated by the acrylics. Polymethyl acrylate is strong, tough and fairly hard. Polyethyl acrylate is softer and poly n-butyl acrylate is soft and sticky. The only difference in these polymers is in the size of their side groups.

The nature of the side group also has an effect on the solubility of a polymer. It is an old chemical rule that like dissolves like. This is borne out in the solubility characteristics of plastics. As examples consider polyvinyl alcohol (P.V.A.) and polyvinyl formal.

It is seen from the formulae that P.V.A. contains the hydroxl (OH) group. Water also contains this group. (H_2O or H-O-H). P.V.A. is soluble in water but insoluble in organic solvents. By treating P.V.A. with formaldehyde and an acid the OH groups are converted to ether linkages (C-O-C). The resulting compound is not soluble in water but is soluble in organic solvents.

This reasoning leads to an understanding of the water absorption characteristics of plastics. Polyethylene, which has a structure similar to wax, has no polar groups and is not related to water. Therefore it has practically no water absorption, whereas nylon with its poplar amide group absorbs considerable water. Cellulose, with its many hydroxyl (-OH) groups, absorbs even more.

Before proceeding with the discussion of the structure of polymer molecules it will be necessary to consider briefly how these molecules are formed, or how the long chains are built up from smaller units. Attention will first be given to addition polymerization. Addition polymerization is one of the most useful reactions in organic chemistry. This reaction produces Lucite and Plexiglas from methyl methacrylate, Styron from styrene, Vinylite from vinyl chloride and vinyl acetate, Geon and Saran from vinylidene chloride and most of the types of synthetic rubber.

The reaction involves the union of many unsaturated molecules to form one long chain molecule. The reacting unit, or monomer, may be represented as

$$\begin{matrix} H & X \\ C & = & C \\ H & Y \end{matrix}$$

X and Y may represent any group or groups. If Y is hydrogen and X is chlorine the resulting polymer is polyvinyl chloride. If X and Y are both chlorine the polymer is Saran, or polyvinylidene chloride. If Y is hydrogen and X a benzene ring the monomer is styrene and the polymer is polystyrene. The units combining to form the polymer may be all alike or may be of two or more types. In the latter case the result is a copolymer such as buna-s or vinylite. A fundamental explanation of this reaction is beyond the scope of this paper, but it will be realized that by choosing the monomer or monomers to include various functional groups it is possible to obtain literally hundreds of different polymers. Also with a certain set of properties in mind one may choose side groups according to the properties which they contribute and thereby design a polymer to suit a certain need. It is necessary, however, to add that this ideal possibility is subject to certain practical limitations.

In synthetic polymers the chain length is controlled by (1) temperature of polymerization (higher temperatures give shorter chains). (2) catalyst concentration (higher concentration gives shorter chains). (3) monomer concentration. In natural polymers the D.P. is controlled by degradation (long chains are broken up into shorter ones). The degradation is accomplished by (1) heat, (2) oxygen or (3) acid treatment.

In general, the greater the chain length, the better are the impact strength, tensile strength, elongation and flexural strength of the plastic.

Besides the effect on mechanical properties, chain length has a profound effect on swelling and solubility of resins. Swelling proceeds in steps and many polymers are swelled by solvents but never dissolve. First there is an absorption of solvent molecules which results in an incomplete separation of chains. Solution is a step beyond swelling and in this case the long chain molecules are completely separated. In low molecular weight compounds the intrusion of a molecule of solvent

(Continued on next page)

PLASTICS

(Continued from Page 12)

between two molecules may completely separate them. On the other hand, in the case of polymers, several solvent molecules may get between two long chains without separating them at all points. They still have a few points of attraction in effect and form a loose network of chains before going in solution. It is apparent that short chains are more easily separated than longer ones. Therefore, for the same polymer the higher solution concentrations (% by wt. of solids) are obtained with low D.P. material. For this reason lacquers and other solutions used for coating employ low D.P. material. However, the film strength is increased with increasing chain length as has been shown in considering the effect of chain length on tensile strength. Therefore one compromises and uses a material of D.P. low enough to permit high concentration but high enough to give good film strength.

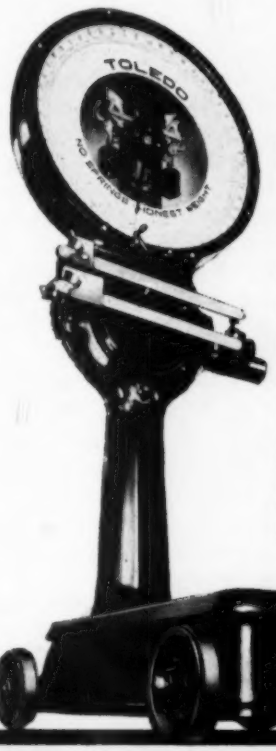
The atoms in the main chain (backbone) have little effect on the mechanical properties. Nevertheless these atoms are of some importance in determining some properties of plastics. In regard to resistence to chemical attack the carbon to carbon arrangement is quite stable (vinyl, acrylics, styrene), but the carbon to nitrogen (-C-N-) and carbon to oxygen (-C-O-) may be broken by hydrolysis. As examples we need only mention the chemical resistance of polyethylene and vinylites and the chemical susceptibility of polyamides and cellulose.

The influence of plasticizers and heat may be included in the present discussion. Although these factors are not structurally part of the polymer, they are external influences which affect the behavior of polymers. Temperature is a measure of the violence of activity of molecular groups. It is also a measure of the tendency of crystallites in a plastic structure to dissociate or melt. High temperature opposes the attachment of groups of neighboring chains. In other words, it weakens the forces holding the polymer together and molecules separate from each other. This is not evidenced by the polymer separating in visible pieces but rather is observed as melting or softening. All linear polymers have some temperature range at which they either become plastic or decompose.

Another method of weakening the forces between chains is to place the polar groups along the chain so that they cannot match up.

If one could screen polar groups so that they would not attract each other readily then one could soften a given polymer at a lower temperature. A plasticizer does this by separating the polar groups by small molecules. Plasticizers wedge in between molecules, separating them so that the van der Waals forces (attraction between molecules) are reduced and by virtue of their own polar characteristics they tend to screen the fields of force surrounding molecular chains. Polyvinyl chloride is stiff and horny alone, but when about 40 percent tricresyl phosphate is introduced between the chains it becomes soft and rubbery.

Although plasticizers make resins more flexible, it is impossible to achieve this flexibility without sacrificing tensile strength. The tensile strength is dependent on the attractive forces between molecular chains. If these forces are weakened or shielded by plasticizer molecules the tensile strength must necessarily decrease.



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POWERS HEADS PLASTICS PAINT DIVISION OF A.C.S.

Paul O. Powers

Dr. Paul O. Powers, Technical Adviser at Battelle Memorial Institute, Columbus, Ohio, member of the Central Ohio Section, has recently been apponted Chairman of the Paint, Varnish, and Plastics Divisio of the American Chemical Society, replacing the late Dr. E. W. McMullen.

Dr. Powers is widely known in the field of synthetic chemistry for his work on plastics, organic coatings, resins, and plasticizers. He is author of the book "Synthetic Resins and Rubbers," as well as chapters and sections in several standard reference works, and holds numerous patents in synthetic chemistry. He is probably best known as the author of charts on the preparation of synthetic resins and rubbers which are published periodically and which are used as standard references by resin chemists.

Dr. Powers is a graduate of Boston University and holds Master of Science and Doctor of Philosophy degrees from the University of Pittsburgh.

Before joining the Battelle staff he was, for ten years, chief of organic research for the Armstrong Cork Company of Lancaster, Pennsylvania. During the recent war he was in charge of development work on new protective coatings for metal surfaces conducted at the Armstrong Cork Company for the Quartermaster Corps, U. S. Army.

His past industrial experience included positions with the Atlantic Dye Stuff Co., Burage, Massachusetts; Calco Chemical Co., Boundbrook, N. J.- the former New England Color Works, Ashland, Massachusetts, and the Newport Industries, Inc., Pensacola, Florida. In addition, Dr. Powers

(Continued on Back Cover)

CLEVELAND SEES GOODRICH TESTING LABORATORY

By GEORGE B. KOCH

The Cleveland Section is under way on what promises to be an interesting season. The second meeting of the year, October 24th, was held at the Cleveland headquarters of B. F. Goodrich Chemical Company, where a visit was made to the Sales Service laboratory. Under the direction of Mr. George Flanagan, director of the laboratory, the SPE members were escorted through the laboratory and shown the equipment used for testing vinyls, synthetic rubbers and other products made by the Chemical Company.

Previous to the laboratory visit, the Cleveland group heard Dr. F. K. Schoenfeld, Vice President —Technical, B. F. Goodrich Chemical Company, on a discussion of his recent tour through France.

The Cleveland Section Prize Paper Contest is under way. The winning Cleveland paper will compete for the National SPE prize of $500. Cleveland Section judges are Dr. Carl F. Prutton, Case Institute of Technology; Mr. E. Williard Pennington, Technical Editor, Industrial Plastics Magazine, and A. Reynolds Morse, Reed-Prentice Corporation.

Congratulations are in order for Dr. Hugh Winn, vice president of the Cleveland Section on receiving his Doctor of Philosophy Degree at Case Institute of Technology. Dr. Winn is on the teaching staff at Case Tech.

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MIAMI VALLEY DISCUSSES AUTO PLASTICS USES

By JOHN L. RUSSELL

The Miami Valley Section's first indoor meeting of the 1947-48 season took place on Wednesday, Oct. 1 at the Engineers Club. This was a dinner meeting to which the ladies were invited. The speaker of the evening was Mr. William Phillips, Head of the Electrochemicals Section, General Motors Research, Detroit, Mich.

Mr. Phillips is a well-known man in the automotive world and is also a National Director of SPI. His talk concerned itself with "The Use of Plastics in the Automotive Industry." A highlight of his lecture dealt with automobile windshields and windows, showing pictures and giving data on comparative Impact tests on Standard Laminated Glass Windows and Plastic Windows. A preview was given into some of the new uses for plastics that will come into vogue in the 1948 model cars.

Mr. H. J. Kasch, Jr., Chairman of the SPE Essay Contest on Plastics, reported that announcements of a $500 first prize for the best essay had been sent to Dayton, Cincinnati and Springfield to interest Miami Valley contestants under 30.

The November meeting will be held at the Mariemont Inn in Cincinnati and will feature as speaker Mr. W. O. Bracken, Hercules Powder Co.

CENTRAL OHIO MEETS AT CAMBRIDGE

By C. W. COOPER

The October meeing of the Central Ohio Section of the Society of Plastics Engineers was held on Friday, the seventeenth, at the Berwick Hotel, Cambridge, Ohio.

Following a dinner, a short business meeting was held and the speaker for the evening was Mr. Robert L. Davis of the Fabri-Form Company, treasurer of the section and co-author with Ronald D. Beck of the book "Applied Plastic Product Design." Mr. Davis gave an excellent talk on "Product Design with Plastics."

Richard Lane described "The History of Laminates" and their development and production at the Continental Can Co. at Cambridge.

The next meeting was held at the Granville Inn, Granville, Ohio, at 7 p. m. on Friday, Nov. 14. After dinner speakers were Mr. W. L. Hess, vice chairman of the National Professional Activities Committee and Mr. G. J. Wilson, member of the National Committee on Chemical Investigation. These men discussed the activities of their respective committees and analyzed the function of similar local committees.

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PROVIDENCE HEARS BORRO TALK ON PHENOLICS

By FREDERICK A. STEARNS

The Rhode Island and Southeast Massachusetts Section of the SPE opened its fall series of meetings at the Providence Engineering Society Building in Providence, R. I. on Oct. 8, 1947. Mr. John Stenberg, President of the section, greeted approximately thirty members and guests, speaking on the good fortune of the society in being able to affiliate with the Providence Engineering Society and to hold meetings in its building. Special commendation goes to Messrs. Angell, Jacobs, and Richardson, the committee which negotiated this. Members were reminded of the society's prize paper contest and efforts to obtain several entries from this section are being made.

Mr. Stenberg then introduced Mr. Borro, Chemical Engineer and Consultant for the Durez Chemical Inc., who gave a very interesting and informative talk on the subject, "Reactions of Phenolics Under Various Conditions." The lecture consisted of illustrated information of the physical and electrical properties of several phenolic molding materials under varied moisture contents, percent of dimensional change at 150°C, percent of weight change at 150°C, impact and flexural strengths at 150°C, heat resistance and the effect of roof exposure.

Mr. Borro, during the course of his talk and via his illustrations, emphasized the fact that one cannot coordinate all properties of phenolics in a given application. Phenolics, like other materials, behave differently under various conditions, and it is impossible to incorporate all the superior properties in one material to meet all these conditions at the present stages of development. Hence, today various materials with specific properties are produced. When considering a new application of plastic material, each function of the proposed part must be investigated.

A lively discussion followed the lecture concerning the properties illustrated in the copies of the talk which were received by those present.

While the attendance at this meeting was somewhat disappointing, it is felt that the society's good fortune in becoming affiliated with the Providence Engineering Society will mean the rapid growth of this comparatively new group, now entering its second year of activities. Future meetings will take place on the second Wednesday of each month at the Engineering Society Building, 195 Angell St., Providence, R. I. Advance notices of the meetings will be sent to members of the Plastics Society, and they are invited to participate as guests in activities of other affiliated organizations of the Providence Engineering Society. It is hoped that members of the affiliated organizations will be benefited by our activities and aid us in promoting good plastics engineering practices.

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EDUCATIONAL COMMITTEE MEETS AT PRINCETON

The first meeting of the Education Committee of the Society of Plastics Engineers was held at Princeton University to discuss the educational needs of the plastics industry and to develop an educational program for the guidance of institutions interested in establishing curricula in plastics.

At this primary meeting the Committee was successful in formulating the basic principles and objectives of engineering education at the professional level. It was concluded that a thorough training in engineering fundamentals precludes specialization in plastics in the time normally allowed for a B.Sc. curriculum in engineering. In recommending that undergraduate instruction in plastics be limited to introductory courses, the Committee recommended that specialization in this field be concentrated at the graduate level.

On the basis of conclusions reached at this meeting the Committee, through its industrial subcommittee, will proceed to consider the specific educational needs of the industry and to develop a program of study to meet these requirements.

This will be released later by the Society for the benefit of the industry education.

The Education Committee is under the chairmanship of Professor L. F. Rahm, Director of Princeton's Plastics Program, and equally represents industrial and educational leaders in the field of plastics as indicated in this list of members:

Prof. J. M. Church, Columbia University
Prof. V. C. Williams, Northwestern University
Prof. Fulton Holtby, University of Minnesota
Prof. R. K. Witt, Johns Hopkins University
Prof. John Delmonte, Plas. Ind. Tech. Inst.
Prof. Hugh Winn, Case Institute of Technology
Mr. Fred Wehmer, Minn. Mining & Mfg. Co.
Dr. N. A. Skow, Synthane Corp.
Mr. D. M. Gray, Stoner Mudge Inc.
Mr. L. M. Hitchcock, General Electric Co.
Mr. H. W. Rose, American Viscose Corp.
Mr. G. B. Sayre, Boonton Molding Co.

EAST NEW ENGLAND NOTES

By E. V. PAINTER

The Eastern New England Section of the Society met for its first fall meeting on Thursday, Oct. 30th at the Hotel Puritan. After a pleasant dinner and the meeting Mr. H. W. Richardson spoke on "Present Trends in Molding of Thermosetting Plastics and Their Probable Consequences."

Mr. Richardson is a well known author in the plastics field and is a partner of the De Bell-Richardson plastics consultants in Springfield. He was the Chief Engineer for many years at the Chemical Department at General Electric.

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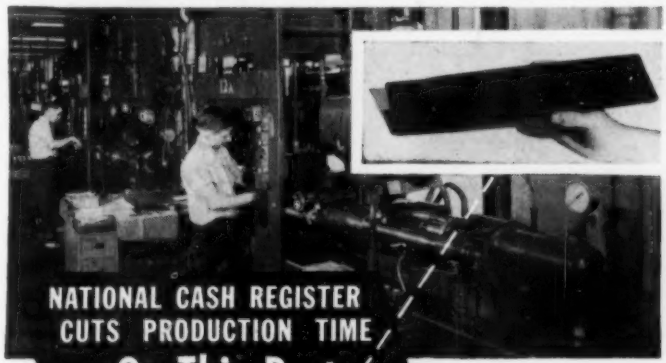

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By-Laws Amended

(Continued from Page 8)

the newly elected Director and the Secretary of the Society.

B-41 A ballot without the signature of the Member voting shall be declared defective and rejected. A ballot that contains crosses opposite more than one name shall not be counted, and a ballot that contains any other writing than that authorized in these By-aws may be declared defective and rejected.

B-42 The term of the newly elected National Director shall begin in accordance with the provisions of the By-Law B-31.

B-43 The Secretary of the Society shall announce the names of the newly elected Directors in a publication of the Society or by letter to the membership.

B-44 (To be Deleted)

B-45 (To be Deleted)

B-46 (To be Deleted)

Upon motion duly made, seconded and passed, the above By-Laws are adopted.

Rules 6, 7, 8 and 9 were discussed with no action taken .

B-105 was discussed, and upon motion duly made, seconded and passed, the following By-Law was adopted:

PROPOSED BY-LAW NO. 3
SECTION OFFICERS

B-105 Each Section Board of Directors shall elect from its members a President, Vice-President, Secretary and Treasurer immediately after the Section's annual elections of Directors, and the latter two offices may be combined. The Section Officers shall serve for one year and until their successors are elected, and the President, Vice-President and Treasurer (if a separate individual from the Secretary) shall not be eligible for re-election to the same office within one year after the expiration of the term for which they were elected. Section Officers who have not served a full term are eligible for re-election. The election of Section Officers shall be by secret ballot, and an affirmative majority vote of the Section Directors present shall be necessary to elect.

By-Law B-64 was discussed pertaining to the election of President whose term is expiring to the post of Director for a term of one year, and to the Executive Committee. Upon motion duly made, seconded and passed, the By-Law Committee was instructed to present such a By-Law at the next Regular Meeting of the National Council which will be held in the City of Detroit, Michigan, at the Horace H. Rackham Educational Memorial on Wednesday, January 21st, 1948 at 4 p. m.

Mr. J. H. DuBois, Vice President, presented the Report of the Publications Committee. The Prize Paper Contest was discussed. The Sponsorship of the SPE News by local Sections was discussed. The disposal of Ring-Binders was discussed. In connection with the Ring-Binders it was agreed that they should be available at the National Annual Technical Conference for sale to members.

Mr. Carl Frosch presented the report for the Professional Activity Groups. After discussion it was understood that the Chairman of the Professional Activity Groups would assign projects to the various Sections for research and report.

Mr. R. G. Dailey reported for the National Meetings Committee and presented his plans and Committees for the National Annual Technical Conferences to be held in the City of Detroit, Michigan, at the Horace H. Rackham Educational Memorial from January 21st to 23rd, 1948.

Upon motion duly made, seconded and passed, the National Annual Meeting of the Society of Plastics Engineers, Inc., is called for 11:30 a. m. on Thursday, January 22, 1948 to be held in the small auditorium of the Horace H. Rackham Educational Memorial, 100 Farnsworth Ave., Detroit Michigan.

Mr. Orr reported for the Membership Committee. He called on Mr. Dunnican and Mr. Richards for reports. He discussed the situation pertaining to delinquent members and stated that while the number was lower than in similar organizations, they would be invoiced again for dues on October 1, 1947. The Sections were urged to speed through the Local Boards 11 applications in process — this process often requires six months and should be completed in six weeks. Sections were urged to direct special attention to the Membership Campaign and that 2500 members were desired by the time of the Annual Meeting.

Mr. Orr reported on New Sections. He stated that priority should be given the formation of a Baltimore-Washington Section on account of a possible National Emergency. Plans were also discussed and approved for Canada, Houston, Dallas, Seattle and Pittsburgh.

Upon motion duly made, seconded and passed, the Golden Gate Section at San Francisco, California, and the Upper Midwest Section in the Twin Cities were recognized as of this date.

Mr. Orr requested that a meeting of all National and Sectional Officers of SPE be held in connection with the Annual Technical Conference and that this meeting be held at 4 p. m. on January 22, 1948 at Detroit.

Mr. Orr reported that Constitutions should be printed. Also he reported and showed a sketch of a Certificate for Meritorious Service. Both of these projects were held up until the next meeting of the Council.

Mr. Orr read communication from Mr. J. R. Hoover, President of the Plastic Materials Manufacturers Association. This communication was discussed but on account of the study required, the Executive Committee was directed to study and bring up the subject at the next Regular Meeting of the National Council. Mr. Hoover was thanked for his communication.

Meeting adjourned at 6:26 p. m.

THOMAS E. ORR,
National President.

WATER (Continued from Page 3)

of moisture change on conditioning, to have unusual "stability." On the other hand, there are certain properties which may be impossible to retain under such influences.

In any laboratory tests which are devised to determine the influence of the weather, it is difficult to interpret the results. The purpose of a weatherometer is to duplicate weather conditions in an accelerated way. This is not always possible because the time cycle in the test may be so reduced as to be incomparable to natural changes.

When materials are exposed to air the moisture pickup depends upon the following factors: (1) Nature of the material; (2) Conditions of the atmosphere or relative humidity; (3) Temperature; (4) Surfaces exposed and, or, Dimensions of the piece. The results of laboratory determinations through much light on the above factors and can be used to predict the ability of a material to fulfill certain requirements.

The usual procedure is: (1) Fix the relative humidity, temperature and dimension of the sample and determine the gain in weight from bone dry at regular intervals until equilibrium is reached; (2) Determine the increase in weight with time at the fixed humidity used in (1) but at various temperatures. (3) Determine moisture content at equilibrium for varying humidities and at a constant temperature. The data obtained in (1) and (2) can be expressed as curves. A series of such curves for different materials offers a method for comparing their behavior in air containing moisture.

Since the moisture concentration for the same relative humidity increases with the temperature, the time rate of moisture pickup is considerably shortened with increasing temperature. The total moisture pickup at equilibrium has been found to be fairly constant at various temperatures.

A material like wood or leather, where both the nature of it and its porosity lend to rapid conditioning, gains moisture very rapidly for a short time, then with increasing time shows no more gain in moisture. Wood and leather owe much of their properties to their porosity and their ability to breath. The relative freedom from checking and cracking and dimensional stability are due to the taking up of expansion and contraction by the pores.

Some of the polymerized esters and copolymers gain moisteur at a regular rate, which is very slow, for an indefinitely long time. Accelerated tests are not dependable in studying material which requires such an extended time for reaching equilibrium. Material of this type loses moisture as slowly as it was taken up. When considering our average weather conditions, we find that high humidities prevail throughout the year in outdoor exposure while high humidities prevail for eight months and low humidities for four in the case of inside exposure. Material like these esters when starting dry and then exposed to the atmosphere will slowly gain moisture. Should the humidity then be lowered momentarily it will lose it very slowly. A material like paper which is not only porous but conditions rapidly, rises and falls in moisture content with every change of atmosphere.

Information obtained in test (2) — where the effect of temperature on the rate of moisture pick-up is determined — is important where porous and rapidly conditioning material is investigated (wood, leather, films and paper).

(Continued on Page 20)

N. W. PENN. AT OIL CITY HEARS MOLD MAKING METHODS

By N. R. REYBURN

Forty-five members and guests of the Northwest Pennsylvania Section of the SPE held their very successful October meeting at the Arlington Hotel in Oil City on October 8th.

The Franklin group, under George Laurenson, arranged a very special dinner which was preceded by a social period.

Following the dinner, Paul Roche, Section President, briefly summarized the aims and work of SPE for the benefit of the many guests who were present. He announced that the nominating committee had one month in which to think over and nominate the 1948 officers.

Program Chairman, Al Loranger, had secured Mr. D. V. Stevens of Kearney and Trecker Products Corporation to give a highly instructive talk on "Selecting Efficient Mold Making Methods." The talk covered description and slides together with samples from molds best suited to each method. Mr. Stevens made a nice distinction between those machines which duplicate an artist's contour and are therefore best suitable to non-geometic patterns as compared to the rotary head milling machines which precision cut any combination of radii and straight lines which form the elements of an irregular surface.

Following this an entertaining talk on the early historical highlights of the area was presented.

A directors' Meeting was held to make arrangements for the November meeting of the group.

New applications for membership were received from R. B. Anderson, Anson Tools and Gages, and Bruce Giddes, Sylvania Electric Products, Inc.

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FIBERGLAS

(Continued from Page 1)

may be a Polyester or other suitable resin. This mat is intended for use in the manufacture of flat sheet laminates by either high or low pressure methods. Style 2 of Type 503 mat is bonded with a thermoplastic binder compatible with low pressure Polyester resins and is intended for use in making formed parts, such as boats, luggage and many other items.

Yarns

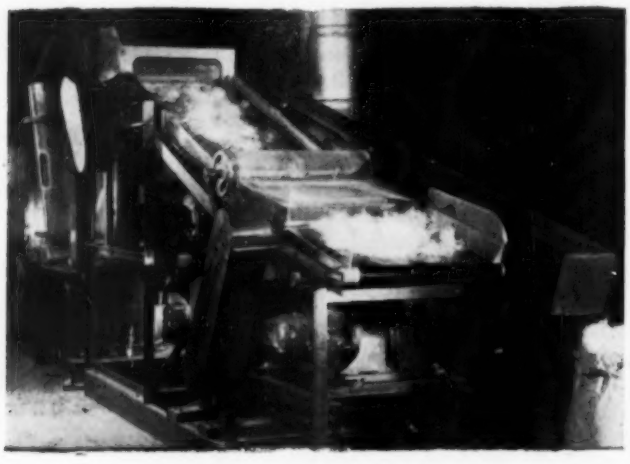
Continuous yarns are used for plastics reinforcement where higher unidirectional strengths are required than can be obtained with unidirectional cloth. The fishing rod is a typical application of this type.

Milled Fibers

Regular continuous yarns are hammermilled into short lengths from 1/32 to 1½ inches in length. This product is used to reinforce compression molded parts. Milled fibers also improve the electrical properties of such parts, provide temperature resistance, prevent crazing and reduce breakage during molding.

Cut Fibers for Blown Preforms

Another important production development program in the O-C-F Laboratory involves the adaptation of the long used hat forming equipment to the making of preforms of glass fibers. This process is designed for high speed production of smaller formed parts.



Figures 1 and 2 show a hat former obtained from the Turner Machine Company, Inc., Danbury, Connecticut, which has been modified to handle glass fibers instead of rabbit and beaver fur as is used for hat preforms. Glass fibers cut in 2 inch lengths (the same fiber as used in Type 503 mat) are passed through high speed picker rolls to separate the strands. They then pass over the conveyor into the forming chamber where they are carried by air down onto the perforated preform screen as it rotates. The screen has the shape of the article to be molded. The fiber build-up on the screen can be varied in thickness by placing larger holes in the screen in the areas where greater wall thickness is desired and by controlling the air velocity in local areas.

Figure 3 shows the preform screen and a finished preform. The fibers are held together in the preform by a thermoplastic resin introduced as the preform is made.

The equipment will be quite versatile as preforms for parts of different shapes and sizes can be made merely by changing to a preform screen of the desired shape and size. After the Turner hat former is modified to handle glass fibers, the **Turner Machine Company plans to build** and sell complete units to make Fiberglas preforms.

All Fiberglas products sold for plastics reinforcement are given special finishes to permit good resin to glass adhesion. This is necessary to prevent moisture absorption which would occur with the ordinary organic type binders. The superior resin adhesion thus attained permits the high strength glass fibers which exceed the high strength metals to impart these strength properties to the laminate.

WATER

(Continued from Page 19)

Water immersion determinations when performed at the same temperature as is used in (1) and indicating the time which is required to come to equilibrium, expressed as a curve, indicate interesting relationships. The rate of moisture pickup on immersion is often found to be the same as when exposed to 100% relative humidity. This indicates stability. Porous materials will approach ultimate penetration or saturation with an appreciable gain in weight.

After reaching the maximum point of water absorption, the effect of slow drying and more rapid drying is of interest. Some moist transparent materials when rapidly dried at high temperatures reach a condition in which the rate of passage of the moisture is slow and the vapor pressure generated gives rise to bubbles.

The reluctance of wood to sink when immersed in water is due to minor constituents known as repellents. Oils and greases have ancient histories as repellents while some more recent improvements are products of the laboratory. As a rule water repellents have little effect on the time

WATER

required to reach equilibrium on exposure to moisture laden air.

When making comparisons as test one, it is found that a material shows no moisture pickup and the curve is a horizontal line, then it follows that this material is a perfect moisteur vapor barrier.

In using comparative data as a basis for judging the applicability of materials for service in a case of substituting for a material already used in this service, the data covering the characteristics of the material in use together with the knowledge of its advantages and disadvantages will lead to a more complete understanding of the requirements of the substitution. The application, however may be an entirely new one.

Whatever the circumstances, it is of prime importance to ascertain the conditions to which the material is to be subjected. Dentures, for instance are subjected to immersion in saliva at 98°F indefinitely. These conditions must therefore be duplicated as closely as possible before determining the properties of the material. If the material under investigation is found to require thirty days to reach equilibrium under these conditions, then this must be the conditioning period.

A material such as represented by esters was suggested for a specific application because it was "springy" or possessed "nerve." Certain other requirements were necessary such as strength, etc., but "nerve" was most essential. It was found that the material as fabricated was practically dry and that conditioning required an extended time (60 to 90 days). Unfortunately a gradual loss of "nerve" was detected at the various stages of conditioning. Since the application called for intermittant use for short times only, it was possible to suggest storage in air tight containers supplied with dehydrating canisters.

Resins have been found to be superior to animal glues because they are unaffected by both high and low humidities as well as absorbed moisture. Any new adhesive material when examined should be compared to adhesives already being used for its retention of adhesion and these comparisons should be made at various conditions in conformity with the conditioning curve. In this case two or three materials may be under investigation. The material to be adhered may consist of two dissimilar materials bound by adhesive. The variety of wood may influence the rate of moisture pickup or total moisture content and show a variation in the action of the adhesive. The repellent quality of woods varies with the species and influences the acceptance of water dispersed adhesives.

The recent excitement created by the introduction of the "steam preheater" was responsible for much moisture absorption by preforms. By determining moisture pickup by the pills in the preheater at various intervals of time, the conditions required in this type of preheating became obvious.

Through years of experience it has been found that certain wood species have specific properties. The fiddle bow requires a certain wood from South America while the archers bow is best when made from osage orange. While cut and try methods will in time lead to the best selection, the time required can be reduced through the use of laboratory tests.

During our recent period of shortages, the use of perfectly good plastic material in applications for which it was unsuited, has detracted from the public acclaim which was once ours. The introduction of new materials has made it necessary to judge the newcomers by their specific properties. Every material producer is interested in the best material for a specific application. The characteristics of products such as steel alloys are a matter of accepted data since years of development lie behind them. Plastics being a recent addition to the materials used in everyday life, it must be expected that some misuse be experienced. However, the fewer of these there are the better will be the public's opinion of "Plastics."

Since most objects are exposed to the atmosphere of which moisture is always a constituent, it is important that the properties of materials to be selected should be examined under the various atmospheric conditions to which they will be subjected. As the plastics industry grows older, information of this nature will become available and find its way into our handbooks.

POWERS IS APPOINTED

(Continued from Page 14)

taught chemistry for three years at the University of Pittsburgh and was a research fellow at Mellon Institute for two years. During the first World War, he served in the development division of the Chemical Warfare Service, and during World War II, he taught engineering, science, and management war training courses at Pennsylvania State College and Franklin and Marshall College.

In addition to his membership in SPE, Dr. Powers is a member of the American Chemical Society, the American Oil Chemists Society, Phi Lambda Upsilon, and Alpha Chi Sigma. He is a member of the Rubber Division of the American Chemical Society and of the Southern Ohio Rubber Group sponsored by that Society. He has served as councillor for the Southeastern Pennsylvania Section of the American Chemical Society, and is a past chairman of that section.

Dr. E. E. McSweeney, supervisor of the Resin and Rubber Research Group, Battelle Memorial Institute, Columbus, Ohio, has served for the past year and a half as secretary-treasurer of the Paint, Varnish, and Plastics Division of the American Chemical Society.

Dr. McSweeney is the present chairman of the Professional Activities Committee of the Central Ohio Section of SPE.

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of the Society of Plastics Engineers, Inc.

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Open to SPE Members and those interested in Plastics Engineering. All Plastics Engineers are invited to attend Technical Sessions and Conferences upon registration. Admission to the Conferences will be by invitation of members and participating companies.

Annual Meeting — January 22, 11:30 a.m.

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Registration	C. H. Whitlock, Monsanto Chem. Co., 427 Fisher Bldg., Detroit 2, Mich.
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Program Publications	H. J. McGowan, Bakelite Corp., 807 Stephenson Bldg., Detroit 2. Mich.
Educational	E. W. Tillotson, Wayne University, 400 W. Warren, Detroit 1, Mich.
Exhibits	John Koons, Chairman, Amer. Plastics & Engineering Co., 3020 E. Grand Blvd., Detroit 2, Mich. M. R. Gerow, Vice Chairman in Charge of Exhibit Sales, Hercules Powder Co., 500 Fifth Ave., New York, N. Y. Don Hoffman, Vice Chairman in Charge of Operations, Evans, Winter & Hebb, 818 West Hancock, Detroit 1, Mich.
Reception	Karl Kithil, Celanese Plastics, 610 Stephenson Bldg., Detroit 2, Mich.
Speakers	Carl Frosch, Chairman, Bell Telephone Lab., Murray Hill, N. J. Gunnar Lindh, Vice Chairman, Udylite Corp., 1651 E. Grand Blvd., Detroit, Mich.

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